

CRT Lab Data tables:

see sample for wires - G to G... x,ys to A2

Set $V_a = 500V$ (plug in the wire from A2)

Between one of the plates and A2 you put batteries, V_d .

Part 1

$V_d (V)$	$D(cm)$
0	0
9.0	0.7
-9.0	-0.7

tapp

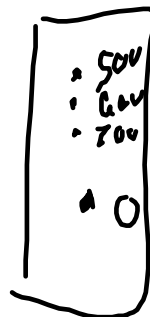


|| points

Part 2 - set V_d to max - (5 batteries)

V_a	D

← max from table 1



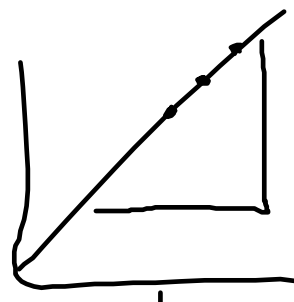
← $V_a = 0$

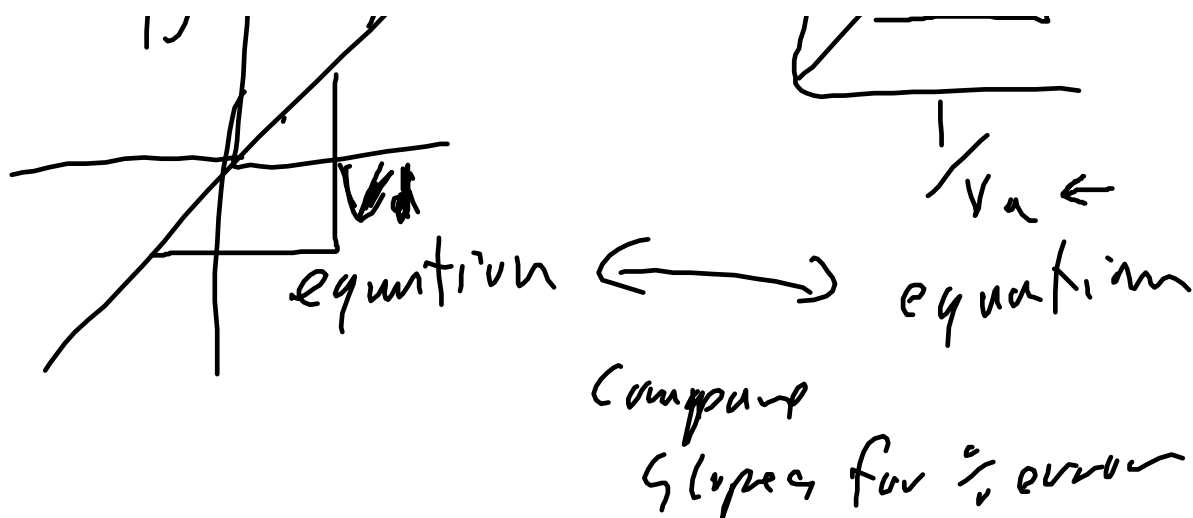
Part 3

Part 1 Graph



D





eg. an electron in a Cathode ray tube is accelerated through 700V (hot filament and a positively charged plate with a hole in it)

a) What is the change in electrostatic energy of the electron?

$$V = \text{Energy}/q \quad \text{energy} = Vq = 700 \times 1.6 = 1,120$$

$$1.1 \times 10^{-16} \text{ J}$$

a) What is the velocity of the electron after the acceleration?

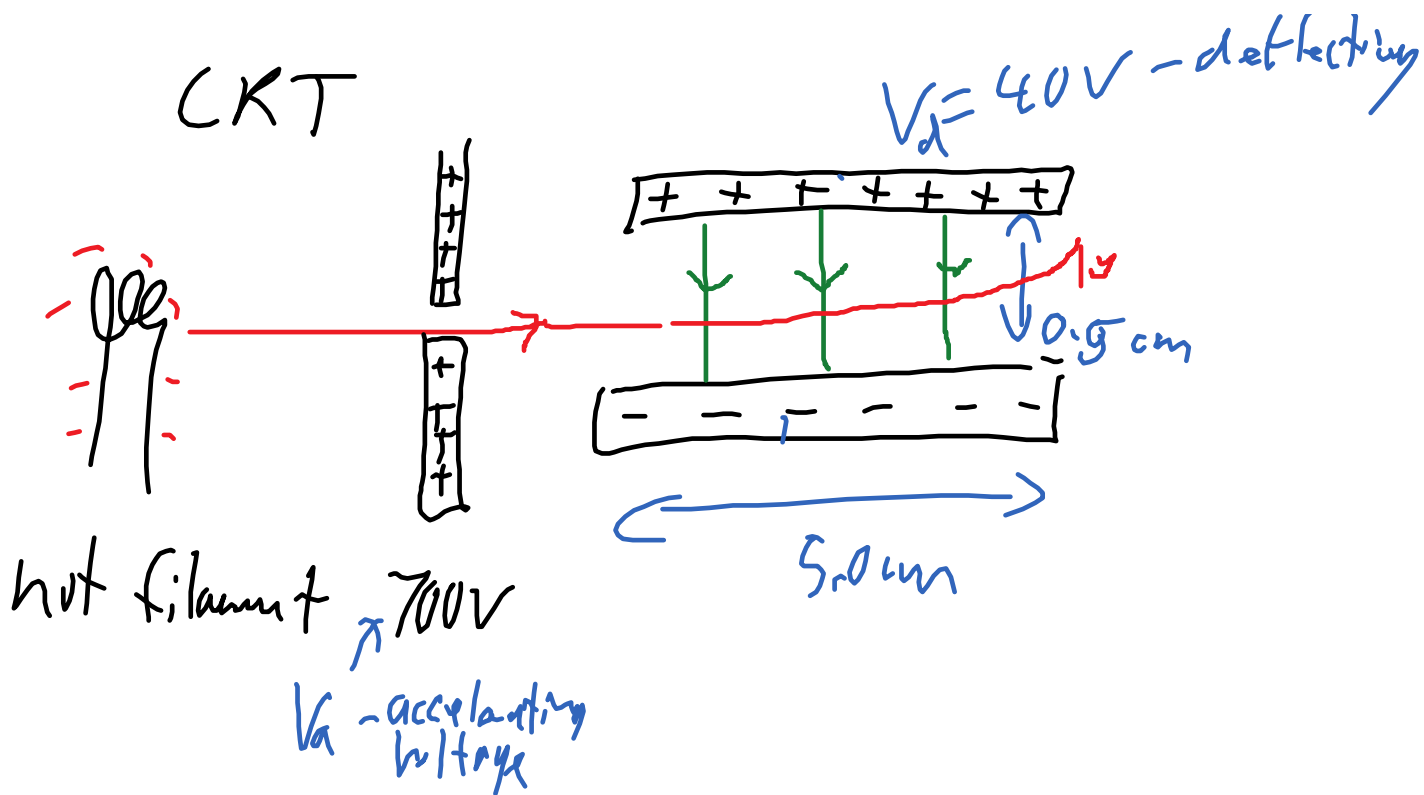
$$\frac{1}{2}mv^2 = \text{energy}$$

$$\text{Sqrt}(1.12 \times 10^{-16} \times 2 / 9.11 \times 10^{-31}) =$$

$$1.56806774198971 \times 10^7$$

$$1.6 \times 10^7 \text{ m/s}$$

The electron then passes through two parallel plates, 0.500 cm apart and 5.00 cm long with 40.0 V of potential between them.



c) what is the electric field strength between the parallel plates?

$$E = V/d = 40/0.005 = 8,000.0 \text{ N/C}$$

a) What is the force on the electron due to the deflecting voltage?

$$F = Eq = 8000 \times 1.6 = 12800 = 1.3 \times 10^{-15} \text{ N}$$

a) what is the deflection of the beam of electrons as it leaves the deflecting plate?

treat it like a projectile but $a = F/m$ not 9.8

$$a = 1.23 \times 10^{-15} / 9.11 \times 10^{-31} = 1.3502 \times 10^{15} \text{ m/s}^2$$

$$y = \frac{1}{2}at^2 \quad t = dx/v_x =$$

$$0.05 / 1.56806774198971 \times 10^7 = 3.18864 \times 10^{-9}$$

$$y = 0.5 \times 1.3502 \text{E}15 \times (3.18864 \text{E}-9)^2 = 0.00686$$

0.69cm deflection so it hits the plate